

Engine 102.983

Adjust valve clearance on separate order only

Adjusting specifications in mm

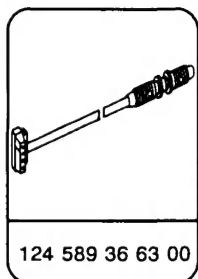
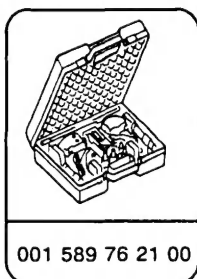
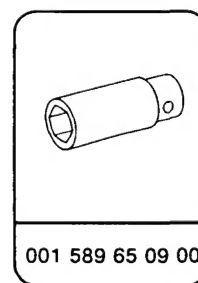
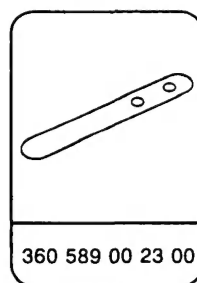
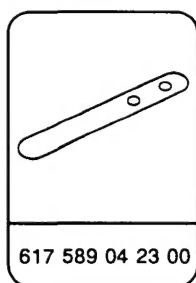
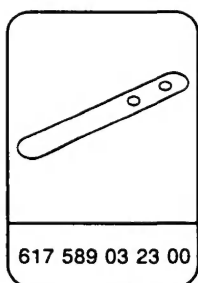
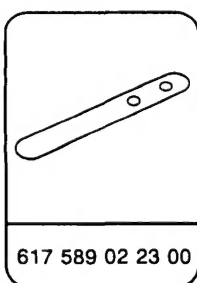
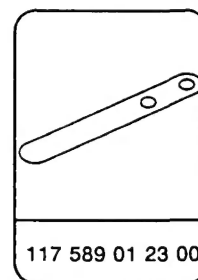
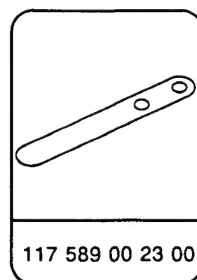
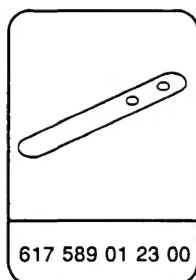
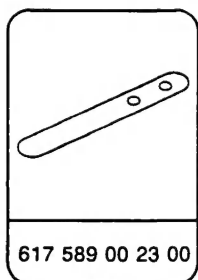
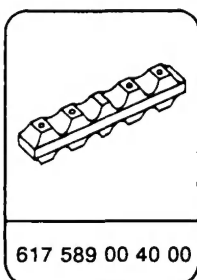
	Cold engine (up to 50°C coolant temperature)	Warm engine (60-80°C)
Intake	0.10-0.20	0.15-0.25
Exhaust	0.25-0.35	0.30-0.40

1) 0.05 mm more during extended ambient temperatures below -20°C.

Torque specifications (Nm)

Cylinder head cover cap nuts	9
Screws, ignition cable cover	20-40

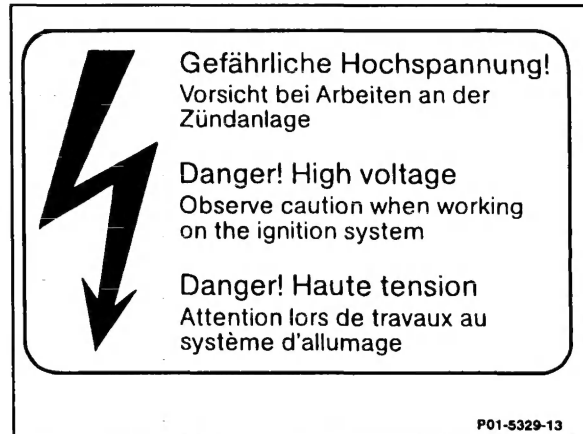
Special tools



⚠ WARNING!

Because of the high ignition voltage, it is dangerous to touch ignition components (ignition coil, ignition cables, spark plug connector, module push connectors) when

- the engine is running,
- the engine is being started,
- the key is in position 2 while the engine is being turned manually.

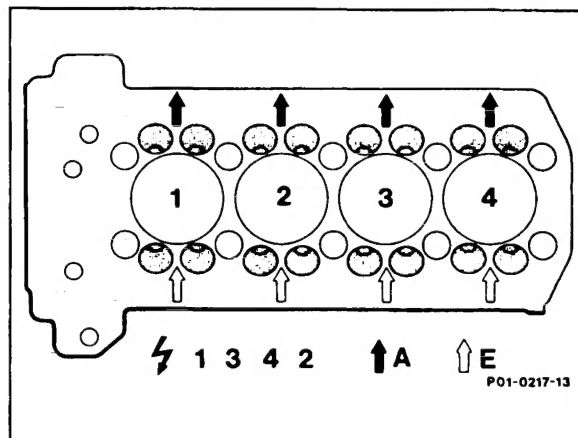
**NOTE:**

Check valve clearance with engine cold or warm.

Note layout of intake and exhaust valves.

E = Intake

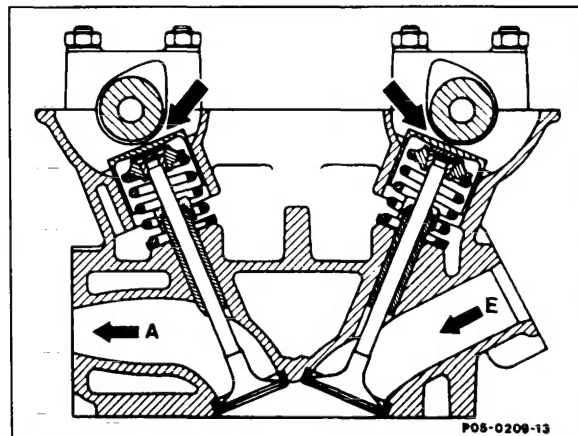
A = Exhaust



Measure valve clearance between bucket tappet and cam base circle (arrows).

Turn the camshaft in such a way that the cam points up (base circle on bucket tappet).

Valve clearance is set correctly if the feeler gauge blades, minimum or maximum thickness, can be pulled through with some resistance (e.g., intake with cold engine, feeler gauge blade 0.10 or 0.20 mm).



Turning the engine crankshaft:

a) By hand

Use socket wrench adaptor (27 mm, 1/2" drive) and ratchet, on the vibration damper bolt.



CAUTION!

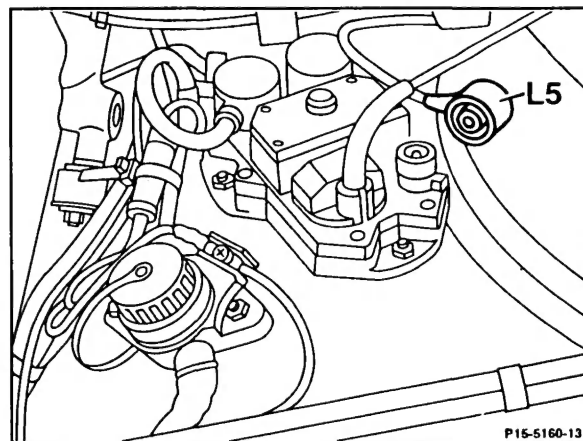
The engine must **not** be turned via the camshaft.

Do not turn crankshaft backwards.

After turning off ignition, disconnect crankshaft position sensor (L5, green cable) from ignition control module.

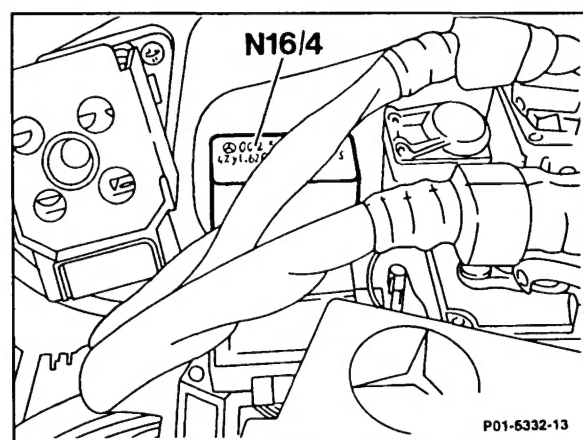
b) With starter:

Disconnect crankshaft position sensor (L5, green cable) from ignition control module.

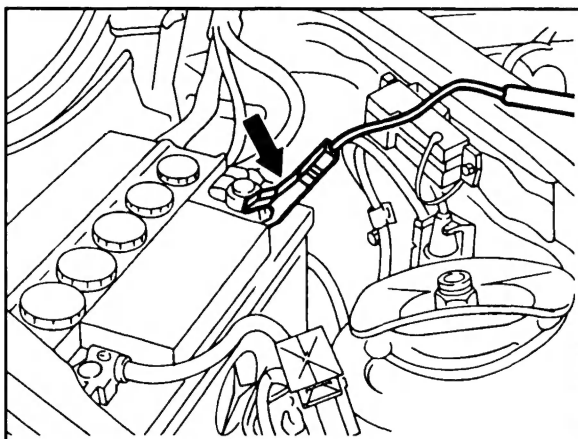


CAUTION!

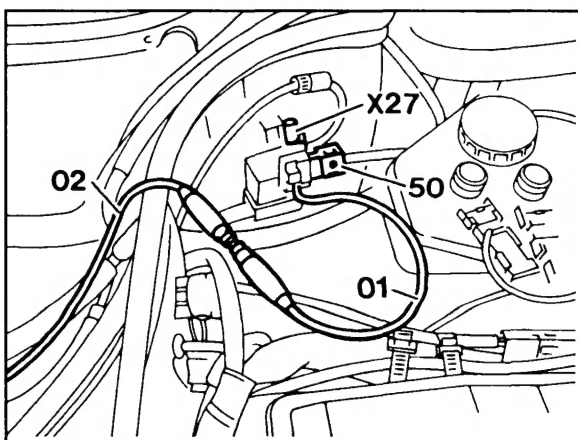
Before turning engine, pull out fuel pump relay module (N16/4), to prevent fuel from being injected.



Connect once clamp of remote starter switch to the battery positive terminal.



Disconnect connector (X27) from plug connector 50. Connect plug from adapter cable (01) 124 589 36 63 00.

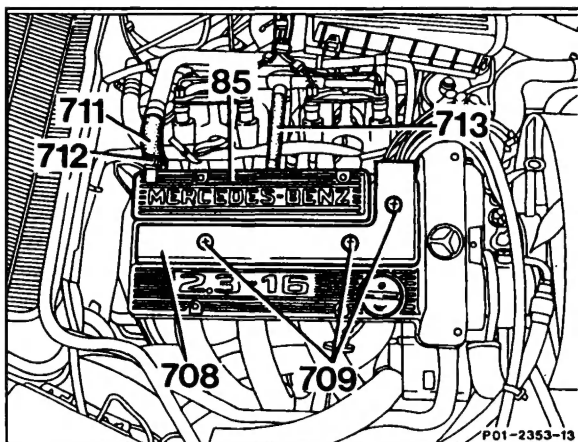


Checking

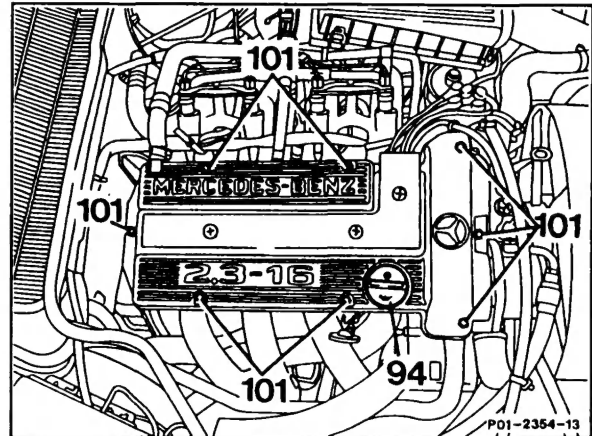
- Remove cylinder head cover.

Remove securing screws (709), remove ignition cable valley cover (708), pull off the spark plug connectors and lay the ignition cable to the side.

Loosen hose clamp (712) and pull off the hoses (711 and 713) on the cylinder head cover (85).



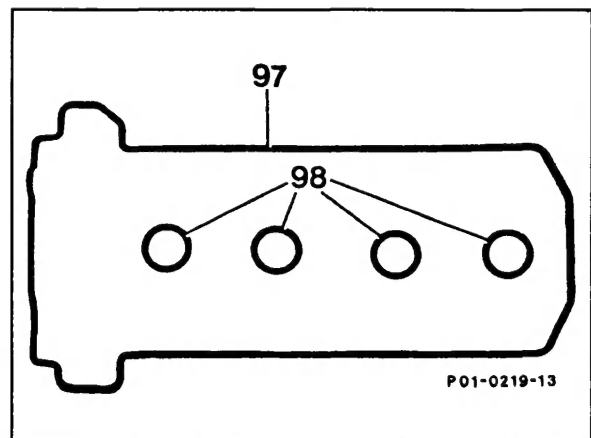
- Remove cap nuts (101) and remove cylinder head cover.



- According to engine temperature and valve (intake or exhaust), try to pull the corresponding feeler gauge blade (minimum and maximum thickness) between the bucket tappet and the cam base circle.

If the feeler gauge with the minimum thickness cannot be pulled through, or if the feeler gauge blade with the maximum thickness can be pulled through lightly, adjust the valve clearance (on separate order).

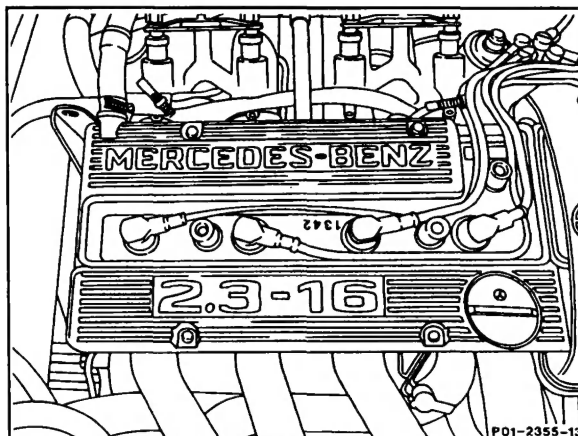
- Check cylinder head cover gasket (97) and sealing rings (98) for damage and replace if necessary.



- Replace cylinder head cover in reverse order of its removal. Gradually tighten cap nuts in steps to 9 Nm.
- Route ignition cable according to the symbols and guide ribs in the ignition cable valley.

Note: Check the valleys for foreign matter before the spark plug connectors are reattached.

- Check for leaks with engine running.

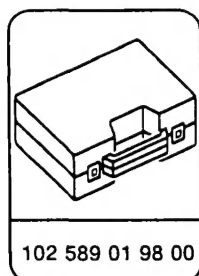
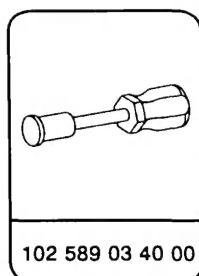


Note the following when adjusting valve clearance

Torque specifications (Nm)

Nuts, camshaft bearing brackets	21
Bolts, timing gear to camshaft	12

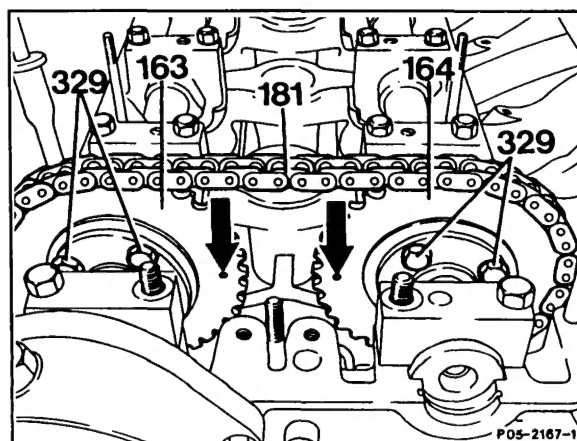
Special tools



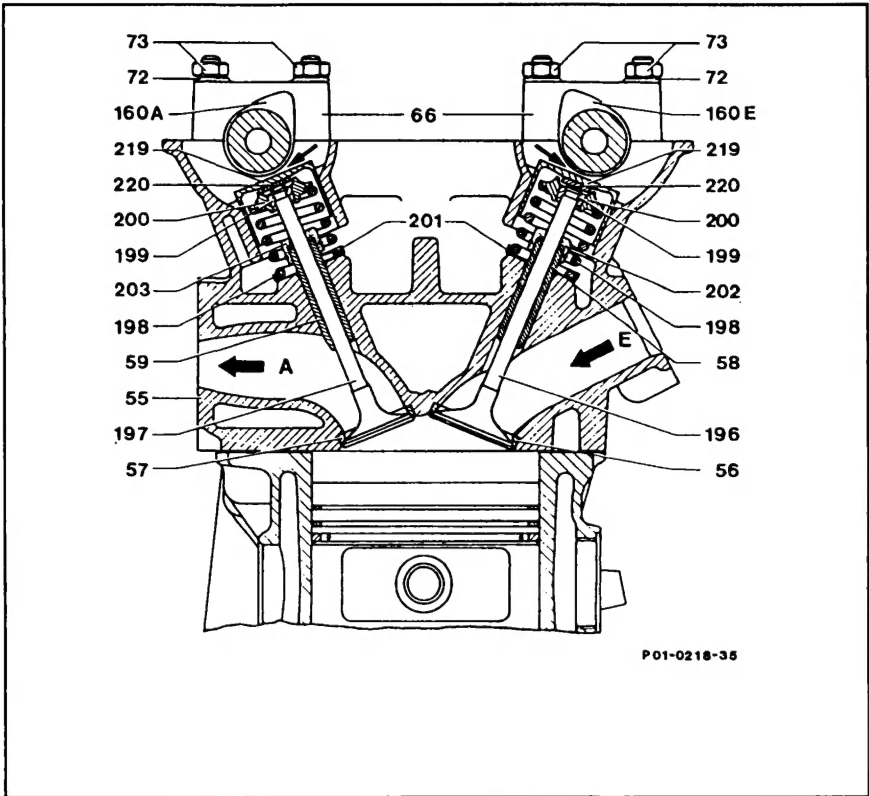
Adjusting

- Remove appropriate camshaft.

Turn the engine to the TDC position of the first cylinder; the holes (2 mm, arrows) in the timing gears must be opposite each other. Mark the camshaft and timing gear for alignment. Remove retaining screws (329, four for each timing gear). Using a plastic mallet, carefully tap the camshaft toward the rear to separate it from the timing gear center collar.



NOTE: If both camshafts are taken out at the same time, mark each for later identification because they are identical.



- Unscrew fastening nuts (73) and take off bearing brackets (66).
- Pull out the corresponding bucket tappet (219) with the magnetic lifter.
- Take out disk (220).
- Position new disk.

Example (intake, engine cold)

Measured value	0.25
Desired average value	0.15
Difference ¹⁾	0.10
Thickness of removed disk	2.8
Thickness of disk to be installed	2.9

¹⁾ If valve clearance is excessive, add the difference to the thickness of the removed disk; if valve clearance is too small, subtract the difference.

With an intake valve clearance of less than 0.10 mm always put in a 0.10 mm thinner disk.

- Set disks in the valve spring retainer.
- Oil and install bucket tappets.
- Oil and install camshaft.

Before tightening the camshaft on the timing gear, carefully tap the camshaft toward the front on the center collar of the timing gear with a plastic hammer. Observe previously inscribed alignment marks.

NOTE: The camshaft can be secured to the timing gear in only one position.

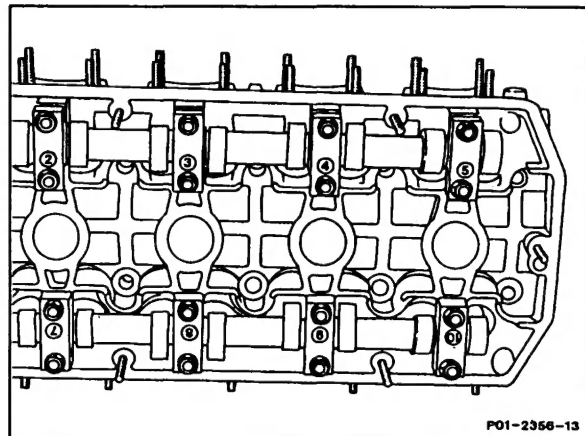
The camshaft bearing brackets are numbered for identification:

Intake camshaft identification numbers 7-10.
Exhaust camshaft identification numbers 2-5.

The stamped identification numbers must be adjacent to the inside stud bolts.

Tighten all nuts equally, in steps.

- Check the valve clearance again (check measurement).



P01-2356-13